

Claims

[c1]

1. A method for generating electricity comprising:  
storing liquid hydrogen in a storage tank;  
capturing boiled off hydrogen gas from said storage tank;  
storing said hydrogen gas;  
fueling a hydrogen conversion device with said hydrogen gas; and,  
generating electricity with said hydrogen conversion device.

[c2]

2. The method of claim 1 wherein said hydrogen conversion device is an internal combustion engine.

[c3]

3. The method of claim 2 further comprising the step of collecting waste heat from said internal combustion engine.

[c4]

4. The method of claim 1 wherein said hydrogen conversion device is an expansion engine.

[c5]

5. The method of claim 1 wherein said hydrogen conversion device is a sterling engine.

[c6]

6. The method of claim 5 further comprising the step of collecting waste heat from said sterling engine.

[c7]

7. The method of claim 1 wherein said hydrogen conversion device is provided hydrogen gas at a rate between 2 scf/hr and 4000 scf/hr.

[c8]

8. The method of claim 7 wherein said hydrogen conversion device is provided hydrogen gas at a rate between 40 scf/hr and 400 scf/hr.

[c9]

9. The method of claim 8 wherein said hydrogen conversion device is provided hydrogen gas at a rate of 40 scf/hr.

[c10]

10. The method of claim 1 further comprising the step of generating liquid hydrogen.

[c11]

11. A method for generating power in a liquid hydrogen storage facility having ancillary and control equipment comprising:

storing liquid hydrogen in a storage tank;  
capturing boiled off hydrogen gas from said storage tank  
operating a hydrogen conversion device with said hydrogen gas;  
generating electricity with said hydrogen conversion device;  
operating the ancillary and control equipment with said generated  
electricity.

- [c12] 12. The method of claim 11 wherein said hydrogen conversion device is an internal combustion engine.
- [c13] 13. The method of claim 11 wherein said hydrogen conversion device is an expansion engine.
- [c14] 14. The method of claim 11 wherein said hydrogen conversion device is a sterling engine.
- [c15] 15. The method of claim 14 further comprising the step of collecting water heat from said sterling engine.
- [c16] 16. An electrical generator system for use in a facility storing liquid hydrogen, said facility comprising:
  - a liquid hydrogen storage tank;
  - a valve connected to said storage tank; and,
  - an hydrogen conversion device fluidly connected to said valve.
- [c17] 17. The electrical generator system of claim 16 further comprising an electrical generator coupled to said hydrogen conversion device.
- [c18] 18. The electrical generator system of claim 17 wherein said hydrogen conversion device is an internal combustion engine.
- [c19] 19. The electrical generator system of claim 17 wherein said hydrogen conversion device is an expansion engine.
- [c20] 20. The electrical generator system of claim 17 wherein said hydrogen conversion device is a sterling engine.
- [c21] 21. The electrical generator system of claim 20 wherein said sterling engine

includes an exhaust outlet and a heat collector adjacent its exhaust outlet, said heat collector transferring heat from said exhaust to another medium.

[c22] 22. The electrical generator system of claim 17 further comprising a buffer tank connected to said pressure relief valve and said hydrogen conversion device.

[c23] 23. The electrical generator system of claim 22 further comprising at least one pump connected to said liquid hydrogen storage tank and electrically connected to a utility electrical grid, said pump moving liquid hydrogen from the tank.

[c24] 24. The electrical generator system of claim 23 wherein said pump is electrically connected to said electrical generator wherein said electrical generator provides electricity to said pump in the event that utility grid electricity is interrupted.

[c25] 25. A method for generating electricity comprising:  
storing liquid hydrogen in a storage tank;  
capturing boiled off hydrogen gas from said storage tank;  
rotating an expansion engine with said hydrogen gas;  
fueling a hydrogen conversion device with said hydrogen gas; and,  
generating electricity with said hydrogen conversion device.

[c26] 26. The method of claim 25 wherein said hydrogen conversion device is an internal combustion engine.

[c27] 27. The method of claim 26 further comprising the step of operating a turbocharger coupled to said expansion engine.

[c28] 28. The method of claim 25 wherein said hydrogen conversion device is a stirling engine.

[c29] 29. An electrical generator system for use in a liquid hydrogen storage facility comprising:  
a liquid hydrogen storage tank;  
a valve connected to said storage tank; and,  
a hydrogen conversion device fluidly connected to said valve;  
an electrical generator coupled to said hydrogen conversion device; and,  
an expansion engine connected to said valve.

*Suba*

[c30] 30. The electrical generator system of claim 29 wherein said hydrogen conversion device is an internal combustion engine.

[c31] 31. The electrical generator system of claim 30 wherein said expansion engine is connected to a turbocharger on said internal combustion engine.

[c32] 32. A pumping system comprising:  
a liquid hydrogen storage tank;  
a hydrogen conversion device fluidly connected to said tank; and,  
at least one pump connected to said hydrogen conversion device.

[c33] 33. The pumping system of claim 32 wherein said hydrogen conversion device is an internal combustion engine.

[c34] 34. The pumping system of claim 32 wherein said hydrogen conversion device is a gas turbine.

[c35] 35. The pumping system of claim 32 wherein said hydrogen conversion device is a expansion engine.

[c36] 36. A method for operating a pump comprising:  
storing liquid hydrogen in a storage tank;  
capturing boiled off hydrogen gas from said storage tank;  
storing said hydrogen gas;  
fueling a hydrogen conversion device with said hydrogen gas; and,  
rotating at least one pump with said hydrogen conversion device.

[c37] 37. The method of claim 36 wherein said hydrogen conversion device is an internal combustion engine.

[c38] 38. The method of claim 37 further comprising the step of collecting waste heat from said internal combustion engine.